

ANNEX NO. 02  
BETWEEN  
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
LYNDON B. JOHNSON SPACE CENTER  
AND  
AXIOM SPACE, INC.  
UNDER SPACE ACT UMBRELLA AGREEMENT  
NO. SAA-RA-22-36162, DATED 4/6/2022  
FOR  
PROPULSION SYSTEMS DESIGN CONSULTING, ANALYSIS, AND TEST  
SUPPORT

ARTICLE 1. PURPOSE

The purpose of this agreement is to provide NASA JSC expertise to Axiom for its space vehicle propulsion system. NASA JSC will provide feedback and consultation to Axiom regarding specific areas including the propulsion system design, the results of the Partner's propulsion testing, and related propulsion analyses. The Partner will perform propulsion testing at a non-NASA facility. Testing and analysis data will be transferred between the two Parties electronically, and travel is not planned by either Party.

NASA JSC's extensive history in propulsion systems for manned spaceflight makes it uniquely qualified to provide subject matter expertise in this area. This support will be of crucial importance to NASA's Commercial Low Earth Orbit (LEO) Program and help ensure its success. This activity will directly support Strategic Goal 2, "Optimize Capabilities and Operations," including Strategic Objective 4.2, "Enable Space Access and Services," in the NASA Strategic Plan 2018.

The legal authority for this Annex, consistent with the Umbrella Agreement, is in accordance with the Space Act, Other Transactions Authority (OTA), 51 U.S.C. § 20113(e).

ARTICLE 2. RESPONSIBILITIES

NASA will use reasonable efforts to:

1. Provide feedback and consultation to Axiom regarding its overall propulsion system design, including the motor design and the pressure system design for thruster firings.
2. Provide analysis and consultation to Axiom regarding its thrusters, including conjugate heat transfer analysis (excluding Computational Fluid Dynamics analysis), combustion analysis for steady state performance, and thermo-mechanical analysis.
3. Provide analysis and consultation to Axiom regarding its propellant feed system, including pressure surge and fluid velocity analysis, thruster-to-thruster interaction assessment, and thermal modeling of the tanks and regulation panels.
4. Provide consultation to Axiom regarding additive manufacturing techniques.

5. Purchase one-year software license for additional analysis modules.
6. Participate in formal and informal technical interchange meetings.

AXIOM will use reasonable efforts to:

1. Perform propulsion testing at a non-NASA facility.
2. Provide NASA JSC with access to test results obtained during propulsion testing operations.
3. Provide NASA JSC with access to propulsion design and analysis results.
4. Participate in formal and informal technical interchange meetings.

### ARTICLE 3. SCHEDULE AND MILESTONES

The planned major milestones for the activities for this Annex defined in the "Responsibilities" Article are as follows:

|   |                                |
|---|--------------------------------|
| Completion of motor design cycle        | Effective Date (ED) + 6 months |
| Completion of qualification test cycle  | ED + 12 months                 |
| Informal technical interchange meetings | As required                    |

### ARTICLE 4. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of \$381,965.87 for NASA to carry out its responsibilities under this Annex. Each payment shall be marked with NASA JSC and Annex No. 02.

B. NASA will not provide services or incur costs beyond the current funding. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Annex will be accomplished for the estimated amount. Should the effort cost more than the estimate, Partner will be advised by NASA as soon as possible. Partner shall pay all costs incurred and have the option of canceling the remaining effort, or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Annex be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within one year after completion of all effort under this Annex, and promptly thereafter, at Partner's option return any unspent funds to Partner or apply any such unspent funds to other activities under the Umbrella Agreement. Return of unspent funds will be processed via Electronic Funds Transfer (EFT) in accordance with 31 C.F.R. Part 208 and, upon request by NASA, Partner agrees to complete the Automated Clearing House (ACH) Vendor/Miscellaneous Payment Enrollment Form (SF 3881).

## ARTICLE 5. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

A. Data produced under this Annex which is subject to paragraph C. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement will be protected for the period of five (5) years.

B. Under paragraph H. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement, Disclosing Party provides the following Data to Receiving Party. The lists below may not be comprehensive, are subject to change, and do not supersede any restrictive notice on the Data provided.

1. Background Data:

The Disclosing Party's Background Data, if any, will be identified in a separate technical document.

2. Third Party Proprietary Data:

The Disclosing Party's Third Party Proprietary Data, if any, will be identified in a separate technical document.

3. Controlled Government Data:

The Disclosing Party's Controlled Government Data, if any, will be identified in a separate technical document.

4. The following software and related Data will be provided to Partner under a separate Software Usage Agreement: None

## ARTICLE 6. TERM OF ANNEX

This Annex becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of both Parties hereto, or eighteen (18) months from the Effective Date, whichever comes first, unless such term exceeds the duration of the Umbrella Agreement. The term of this Annex shall not exceed the term of the Umbrella Agreement. The Annex automatically expires upon the expiration of the Umbrella Agreement.

## ARTICLE 7. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Annex by providing thirty (30) calendar days written notice to the other Party.

## ARTICLE 8. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Annex.

### Management Points of Contact

NASA Lyndon B. Johnson Space Center

D. J. Kroeger

Chief, Propulsion Systems Branch

AXIOM SPACE, INC.

Matt Ondler

Chief Technology Officer

Mail Stop: EP4  
2101 NASA Parkway  
Houston, Texas 77058  
Phone: 281-483-9019  
dennis.j.kroeger@nasa.gov

1290 Hercules Ave  
Houston, TX 77058-2769  
Phone: 346-293-7045  
matt@axiomspace.com

Technical Points of Contact

NASA Lyndon B. Johnson Space Center  
Eric Hurlbert  
Aerospace Engineer  
Mail Suite: EP4  
2101 NASA Parkway  
Houston, Texas 77058  
Phone: 281-483-9016  
eric.a.hurlbert@nasa.gov

AXIOM SPACE, INC.  
Robert Swanson  
Propulsion Manager  
1290 Hercules Ave  
Houston, TX 77058-2769  
Phone: 713-458-8269  
roberts@axiomspace.com

ARTICLE 9. MODIFICATIONS

Any modification to this Annex shall be executed, in writing, and signed by an authorized representative of NASA and the Partner. Modification of an Annex does not modify the terms of the Umbrella Agreement.

ARTICLE 10. SIGNATORY AUTHORITY

The signatories to this Annex covenant and warrant that they have authority to execute this Annex. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND  
SPACE ADMINISTRATION  
LYNDON B. JOHNSON SPACE  
CENTER

AXIOM SPACE, INC.

BY: \_\_\_\_\_  
Julie Kramer White  
Director, Engineering

BY: \_\_\_\_\_  
R. Matthew Ondler  
CTO

DATE: \_\_\_\_\_

DATE: \_\_\_\_\_